

**ABSTRACT**

The invention is directed to a system for processing an electromagnetic wave by receiving rectangular coordinate information for the electromagnetic wave; and directly converting the rectangular coordinate information into a magnitude signal, a  $\sin(\Phi)$ , and a  $\cos(\Phi)$  signal using a CORDIC algorithm, where  $\Phi$  represents a phase of the electromagnetic wave.

The direct converting may be accomplished using shift and add/subtract operations in a processor and a look-up table, or by using at least two cascaded processors employing the CORDIC algorithm.